

COMMISSIONERS OF
INTERNAL AFFAIRS UNIT

E105
1995

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GRENADA

NATIONAL

ENVIRONMENTAL

ACTION PLAN



PREFACE

Faced with all the characteristics of an island developing state, Grenada is particularly susceptible to external economic factors; natural and man made disasters; limited land space for population development/growth; limited or non-existent institutional capacities, which place heavy burdens on the already scarce existing financial resources and which can restrict the management of the environment and natural resources.

Its small size, geographical location, economic structure, cultural and community development have played a major role in creating a certain stress on the environment which could result in the destruction of its natural resources, if mechanisms are not put into place to ensure sustainable development. Moreover, development strategies have largely been employed without taking into account its fragile eco-systems and its specific economic and ecological vulnerabilities.

The NEAP seeks in particular to address the question of environmentally sustainable development in the state of Grenada and to determine what strategies need to be adopted to attain it. It forms part of an overall medium term strategy of the Government of Grenada to promote economic growth, while at the same time taking the appropriate steps to preserve and protect the environment within sustainable limits.

The formulation of this National Environmental Action Plan (NEAP) represents a bold initiative on the part of the Government of Grenada to tackle the problem of Environmental degradation occasioned by the intensity and misuse of natural resources in the key economic sectors of Agriculture and Tourism.

The NEAP reflects, and incorporates the views of a wide cross section of the population of Grenada to include Government, private sector and non governmental organizations, following a series of island wide consultations, initiated by a Cabinet appointed committee to prepare the Action plan. The Government of Grenada wishes to acknowledge the contribution made by all of these and also by the World Bank and the Caribbean Conservation Association (CCA) in the preparation of this document.

BRIEF BACKGROUND ON GRENADA

Grenada is situated at the southern end of the Lesser Antilles approximately 90 miles north of Trinidad. Its territory (referred to as Grenada) consists of three main islands; Grenada (the mainland), Carriacou and Petit Martinique together with a number of small islands, islets and rocks which lie offshore from the main islands.

The climate is classified as humid tropical marine with two main seasons, the Dry season from January to June, and the Rainy season from June to December. The rainfall pattern closely follows topography, varying from 1270 mm at Point Salines in the dry South-west, rising to 4060 mm in the wet central hills.

Location Latitude: 11 degrees 58 minutes/12 degrees 13 minutes North

Longitude: 61 degrees 20 minutes/61 degrees 35 minutes West

Area

Grenada 21 miles long and 12 miles long
120 sq.miles or 78,000 acres (312 sq.km or 31,200 ha)

Carriacou (15 miles to the north of Grenada)
13 sq.miles or 8,500 acres (34 sq.km or 3,400 ha)

Petit Martinique (2.4 miles east of Carriacou)
0.9 sq.miles or 575 acres 92.3 sq.km or 230 ha)

Total 133 sq.miles or 86,500 acres (346 sq.km or 34,600 ha)

Topography

Lands over 30° slope
Lands over 20° slope
Lands over 10° slope

Grenada	Carriacou
23.3%	3.15%
70.9%	47.4%
9.9%	24.4%

Population

Approximately 95,000, largely concentrated in the Southwestern part of the main island near the capital of St. George's.

Economic Activities

Agriculture, tourism, small manufacturing Grenada sector.

Carriacou and
Petit Martinique

Inter-Island trade, fishing, livestock raising, subsistence agriculture, boat-building.

Primary Crops

Cocoa, nutmeg and Bananas

Secondary Crops

Coconuts, sugarcane, citrus

Tourism Industry

Centered around the southwestern part of Grenada, with most of the tourism plant concentrated in the Grand Anse Beach area

Airport

The International Airport at Point Salines in the Southwestern corner of Grenada, replaced the smaller Pearls airport on the east coast

Major Ports

St. George's; other ports of entry: Hillsborough in Carriacou, and Grenville in Grenada

Physical Features

Apart from some limestone in the north, Grenada the island is volcanic. It is mountainous and thickly wooded, with numerous streams and rivers. The central mountain mass consists of a number of ridges, some of which contain crater basins. Mount St. Catherine (2,749 ft/840m) is the highest peak. The island boasts several outstanding beaches.

Carriacou and
Petit Martinique

Both islands are volcanic mountain peaks with shallow soil.

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BACKGROUND

1.1 OVERVIEW OF THE STATE OF THE ENVIRONMENT

1.1.0 Grenada is well known for its majestic beauty, lush vegetation and land and marine resources co-existing in a well-balanced ecosystem. It boasts of some of the most scenic beaches in the Caribbean, picturesque landscapes, and lush tropical forests. The country retains some of its mountaintop forests and coral reefs, over 450 species of flowering plants and 150 species of birds, and broad expanses of pleasing, unspoilt landscape.

In 1982, about 11 percent of Grenada was covered by forest, mostly in the Grand Etang Forest Reserve and in the Mount St. Catherine area. Approximately 30% comprises natural forests which remained relatively undisturbed by developers and cultivators. However, ever-increasing pressures on the environment have resulted in a notable increase in soil and beach erosion, sedimentation of rivers and coastal areas; decrease in agricultural and fisheries productivity, loss of habitat, and pollution. A shift in the agricultural terms of trade in recent years has led to increased banana cultivation on steep slopes and marginal lands and, since bananas have relatively shallow roots, this has contributed to increased soil erosion. Tourism-induced economic activities have also intensified pressure on land use.

1.1.2. Disposal practices for solid waste and sewage also engender serious pollution problems in Grenada, the most critical of which is Solid Waste disposal. Collection containers and the disposal sites are health hazards and public nuisances. Failure to act in a concerted manner to deal with the problem of waste management could result in a degradation of national public health and could adversely affect the tourism product. Inadequate sewage disposal is contributing to polluted rivers and coastal waters in densely developed areas, resulting in destruction to coral reefs and marine life. The existing sewerage system lies in the capital, St. George's. However, the large hotels in the Grand Anse area, and establishments within the industrial estate are expected to be linked up to a new system in 1994. Potable water quality is considered adequate, however water distribution during the dry season needs to be critically addressed.

1.1.3. The Government recognizes the importance of the tourism, agriculture, and public health and safety. In addition to the inappropriate disposal of solid and liquid wastes, the Government considers environmental issues relating to land use management, coastal zone management, water pollution, forestry and protected areas, and natural hazards as important policy action areas for sustainable growth. Over the years, the public has generally been sensitized on the importance of preserving the natural environment through various Government initiated public awareness programs directed at all members of the society.

1.2 The Economy and Social Indicators

1.2.0. Grenada is a small open economy which has recently undergone significant structural adjustment, to include a gradual shift from traditional agriculture to tourism and a reduced role for state-owned enterprises. Adhering to the policies of 1984, the country experienced strong private-sector led growth averaging 5.5% per year during the 1980s. However, in the last two years, growth receded to 0.6% in 1992 under the mounting pressures of deteriorating public finances and worsening agricultural terms of trade. Negative Government savings, continued balance of payments deficits and domestic and external debt arrears impinge on Government's financial capacity to promote sound economic growth while taking into account the preservation of the environment. The unemployment rate is estimated at about 17 percent, (1993) and inflation remains low at about 3-4 percent.

1.2.1. Tourism is the fastest growing sector of the economy, stimulated by improvements in airline service and an increase in Caribbean cruiseship business. Accommodation is provided by a few large hotels of international standards, built in the environs of Grand Anse beach, and numerous small establishments. Stayover tourist arrivals have doubled since 1984 and the number of cruiseship visitors has risen at a faster rate. In 1991, total receipts from all tourists amounted to 62 percent of export of goods and nonfactor services or 34 percent of GDP.

1.2.2. Agriculture, formerly the dominant sector, declined from 22% in 1981 to 15% of GDP by 1991. The main agricultural products are nutmeg, mace, bananas, cocoa and fresh fruits and vegetables and these account for about 78% of domestic merchandise exports. Nutmeg and mace are derived from the same fruit and account for about 30 percent of exports, followed by banana (24%), cocoa (18%), and fresh fruit and vegetables (6%). Grenada is the second largest producer of nutmeg and mace after Indonesia.

1.2.3. Success with regional export market development and tourism induced domestic demand contributed to a growth in agro-processing and light manufacturing. The principal manufactured goods include beverages, flour, animal feed, and paint. Manufacturing activity expanded rapidly in 1987-90 reflecting an increase in the production of flour, beverages, paints and surgical gloves. Also during this period, there was a shift from the labour-intensive production of clothing, to electronic assembly and data processing. Growth in this sector slowed from 10% per annum to almost zero in 1992 as both domestic and foreign demand weakened.

1.2.4. Grenada's strategy for sustained development is enunciated in its Economic Policy and Strategy Paper, 1990-95, and its Macroeconomic 1991-1995 the Structural Adjustment Plan, 1992 -1994. The Strategy is based on the promotion of private sector development through stable government policies, public sector investment in supporting infrastructure and human resource development and fiscal incentives to private investors. The focus on infrastructure and the environment is reflected in the PSIP for 1992-94. Infrastructure accounts for 30 percent of all expenditure, whilst water and sewerage account for 16 percent.

1.2.5. Most available social indicators for Grenada compare reasonably well with countries of similar levels of development and physical characteristics. Life expectancy at birth in 1991 was 70 years. The infant mortality rate is 32 per thousand live births, and access to safe water is 100 percent in urban areas and 77 percent in rural areas. Grenada has a highly literate and adaptable work force.

1.3 Economic Policies and the Environment

1.3.0. Economic policies that are not carefully designed and executed, can result in serious negative effects on the environment. In fact, some policies that are aimed at stimulating certain economic activities contribute to environmental degradation. For example subsidies for the purchase of fertilizer, pesticides, etc, often constitute policies that encourage excessive and inappropriate use of toxic inputs. Effective management of the natural resource base, therefore requires regulatory measures that are applied in tandem with appropriate economic policies.

1.3.1. Government's present environmental policy focuses primarily on the protection of sensitive terrestrial and marine space and adequate disposal of solid and liquid waste. Both areas offer scope for supplementing the current regulatory environmental policies with economic policies as incentives to stimulate the sustainable use of the natural resources and environmental preservation.

1.3.2. Ongoing structural adjustment efforts provide the Government with the opportunity to articulate an economic policy framework to address natural resource management and environmental degradation. For example as the country's resources become more depleted management could be enhanced by proper pricing and conservation mechanisms. For example in the case of water resources, the National Water and Sewerage Authority, NAWASA collects about 55 percent of the costs of water supply. Meanwhile this utility lacks funds to undertake maintenance and capital expenditures. Given that pipe leakages account for substantial water supply loss and that during the dry season water is rationed to the hotels, it is imperative to introduce incentives to discourage the wastage of water.

1.3.3. Refuse is collected free of charge by the Government, while budgetary constraints hamper the maintenance or collection vehicles and disposal site equipment. Adequate charges are expected to be levied to defray the costs of solid and liquid waste disposal.

1.3.4. Economic policies will be formulated in support of natural resource management, particularly as it relates to forestry and protected areas. The Government has already started, effective May 1993, to charge park entry fees to the Grand Etang and Annandale Forests. Similar fees will be charged to visit museums. These fees will be allocated to the maintenance and upgrading of facilities.

1.3.5. The Government recognizes the increasing need to implement effective economic policies in order to achieve its environmental goals. The Government will review its tax and other economic policies relating to the forestry sector and other environmentally sensitive areas with a view to protecting them from further degradation. For example, government will consider reviewing the existing tax on solar units, so as to discourage the use of fossil fuel and encourage alternate renewable energy sources.

1.4. Population Policy.

1.4.1. According to the 1991 census, Grenada has a population of approximately 94,000. Due to past international migration patterns, population pressure is not an immediate environmental concern. The population actually declined in the 1970s. However, migration slowed in the 1980s and the population grew in those years by about 0.2 percent per annum. The average household size has also fallen from 4.2 in 1981 to 3.7 in 1991. However, like many of the islands in the Caribbean, Grenada has a very young population, with about 41% being below the age of 15. The Government will intensify its efforts to educate the population on the benefits of smaller family size, and will maintain and expand its support for family planning programs as part of its overall policy for sustainable development.

1.5. PRIVATE SECTOR PARTICIPATION

1.5.0. The private sector in Grenada has been playing a significant role in environment preservation. Some private sector organizations and N.G.O.s have implemented several environmental projects, and have supported environmental conservation activities undertaken at the village and community level. Some of the more significant contributions include: a documentary video on the effects of marine pollution in the south western coastal areas of Grenada, produced by the Agency for Rural Transformation (ART); enhancement of the environment (garbage collection, tree planting,) of the town of Grenville and the restoration of the Old Church as

a historic building, projects which were undertaken by the St. Andrew's Development Organization (SADO); adoption of various sites of interest by private sector organizations and individuals, introduced by the Grenada Board of Tourism.

1.5.1. The private sector in Grenada is able to influence environmental management decisions because of its influence, through consultation with Government agencies, in the planning process and the advocacy role it plays on environmental issues.

2.0 ENVIRONMENTAL PRIORITIES

2.0.1 In order to ensure sustainable growth in the future, Government has identified the following environmental issues for priority attention within its Medium Term Economic Framework.

1. Solid Waste Management
2. Water Supply and Liquid Waste Management
3. Land Use Management
4. Coastal Zone Management
5. Water Pollution
6. Forestry and Protected Areas
7. Natural and Man-made Hazards

2.1 SOLID WASTE MANAGEMENT

Background

2.1.0. The Solid Waste Division of the Ministry of Health is responsible for solid waste management in Grenada. The department operates a garbage disposal system which consists of garbage trucks, a series of garbage bins and three designated waste disposal sites: Perseverance, serving the southern and western parts; Telescope serving the Northern and Eastern parts of mainland Grenada; and Dumphreys in Carriacou. Industrial and commercial establishments are required to take their waste to the disposal sites. However this system only serves the towns and adjacent major population centers. For the remaining areas, the Solid Waste Division, through the media and the Environmental Health Officers, encourages the use of individual household disposal pits for non-biodegradable waste and compost for other waste.

MAJOR PROBLEMS

Inadequate disposal of solid waste materials is a major environmental concern to Grenadians. The problem has been amplified in recent years as a result of changing consumer patterns and increased tourism resulting not only in higher per-capita solid waste output, but also a higher proportion of non-biodegradable, and metallic substances in total garbage.

The problem is further compounded by the absence of a well designed Solid Waste Management Plan, ineffective legislation and inadequate financial and technical support to facilitate effective implementation. The level of public participation in solid waste management has been limited; legislative provisions are outdated, and user fees are generally low or non-existent.

Inadequate Solid Waste disposal has adverse effects on the environment; garbage collection is irregular (equipment frequently break down) and disposal sites have been reduced to unsightly open dumps. Apart from the immediate potential danger to Public health, the disposal of waste in wetlands have destroyed plant communities, displaced wildlife and affected water quality via surface run off and toxic leachates with bio-chemical oxygen demand. (BDD).

PROPOSED ACTIONS

Previous initiatives taken by the government to address the issue of solid waste disposal in Grenada have not been sustainable. For example, in 1984, USAID/Project Hope provided financial and technical assistance for the upgrading of the Perseverance Dump to sanitary landfill status. The project also provided vehicles and equipment to upgrade the system of collection and disposal of solid waste. The results however, were short-lived.

Current initiatives to deal with Solid Waste disposal form part of the World Bank/OECS Solid Waste Management Project. Major components of the project include:-

- the design and construction of sanitary landfills at Perseverance in Grenada and Dumphreys in Carriacou.
- the installation of waste collection facilities at the major port of St. George's and various small craft harbours in Grenada and Carriacou.
- the procurement of vehicles, machinery and equipment for inland collection and transportation of solid waste
- institutional strengthening of the Solid Waste Division of the Ministry of Health.
- Ongoing maintenance of machinery and equipment.

The Grenada counterpart funding is estimated at U.S \$9.2 million. The balance of financing to be in the form of a Global Environmental Facility (GEF) grant, and soft loans to be contributed by the European Investment Bank (EIB) and the Caribbean Development Bank (CDB).

The Government of Grenada will also provide additional support for Public Education campaigns designed to heighten national awareness for better waste disposal practices. This will include the concept of recycling or resource recovery.

2.2 WATER SUPPLY AND LIQUID WASTE MANAGEMENT

2.2.0 Water supply and liquid waste management responsibilities are shared by both the National Water and Sewerage Authority (NAWASA) and the Ministry of Health. Although Grenada's water supply and liquid waste systems are under the responsibility of NAWASA, the Ministry of Health is charged with the responsibility for monitoring water quality and hazardous waste in the state.

WATER SUPPLY

2.2.1 Approximately 60% of the population have private water service, 21% use public standpipes and 19% use rain water catchments, private springs, streams or ponds (Population and Housing Census, 1991). Approximately 80% of Grenada's households are supplied with public water. Private water service is projected to increase to 70% of the population by the year 2000.

2.2.2 At present, there are 29 water supply facilities on Grenada, 23 surface and 6 ground water. These facilities provide a total supply capacity of about 7.0 million gallons per day (mgpd) in the rainy season. This capacity may diminish to about 4.8 million gallons per day during the dry season. The maximum demand occurs during the dry season and is estimated to be approximately 6.5 million gallons per day, a deficit of 25% during that period. The projected demand for the year 2000 is estimated to be approximately 10.69 mgpd. Increased supply will not be sufficient to meet the demand unless it includes a reduction of the current estimated system leakage at about 50% of the water produced.

2.2.3 Grenada's only natural water supply storage reservoir for surface water is the Grand Etang Lake. However, its storage capacity has been considerably reduced by encroaching weeds and silt.

2.2.4 Water supply on Carriacou and Petit Martinique is provided almost entirely through private catchments and cisterns. Existing water demand in Carriacou is about 60,000 gallons per day, half of which is used for human consumption, the remainder is used for livestock watering. The average per capita consumption is estimated at 10 gallons per day with a wastage of 10%. During the last three months of the dry season, a period which might be without any significant rainfall, the present storage capacity of 3 million gallons is just able to meet the demands of human consumption.

PROBLEMS

2.2.5. The water supply problem in Grenada extends from collection through to distribution. The problem is identified as a combination of poor watershed management, a poor distribution network, inadequate storage capacity and inadequate maintenance of treatment plants. There is also the problem of a decrease in water levels at intake dams and algal growth in slow sand filters. The latter is an indication that fertilizer residue from within the watershed areas is entering the system.

PROPOSED ACTIONS

2.2.6. An improvement in water supply to the important tourism belt in the south west of the island is considered critical to the growth prospects of the Grenada economy.

At present, NAWASA is formulating a comprehensive medium term plan to address the shortage of water. The essential elements of this plan include:-

- (i) the construction of much larger dams and storage reservoirs in the catchment areas.
- (ii) improved management of the watershed areas to be undertaken in collaboration with the Ministry of Agriculture and Forestry, as part of the Tropical Forestry Action Plan (TFAP).
- (iii) the replacement of worn out distribution lines and the creation of a national grid.

- (iv) island wide metering of consumers and market pricing of water services to promote conservation practices.
- (v) strengthening of the management and technical capability NAWASA.

Current initiatives being undertaken by the Government and NAWASA to improve the water supply situation are centered around three (3) ongoing projects, namely:-

- (1) The Grand Etang/Annandale project to increase the volume of water in Annandale to 400,000 gpd by pumping some of the escaping water from the Grand Etang Lake into the Annandale catchment, which will continue to service the St. George's and Grand Anse areas.
- (2) Baillies Bacolet Bore Hole project -- This project is expected to produce 200,000 mgpd to serve mainly the Woburn and Grand Anse areas.
- (3) Peggy's Whym project -- Expected to increase production from 400,000gpd to 1.0 mgpd by December, 1994.

Further, NAWASA has developed a short term proposal to construct a series of storage tanks in affected areas, particularly, the South West Triangle, which constitutes the tourist belt. Government is also providing incentives to private enterprises for the construction of desalination plants, in an effort to alleviate the problems relating to water supply.

LIQUID WASTE

2.2.7 Septic Tanks and soak Away Pits Central Sewer collection System and Pit Latrines are the standard methods of sewage disposal in Grenada. Except for the areas served by the Central Sewer Collection System, the general practice is to allow only waste from water closets to the septic tanks. The grey water from kitchens and laundries runs into concrete drains and finds its way to the rivers and coastal waters.

2.2.8 The Central Business District in St. George's and Grand Anse are the only two areas served by the Central Sewage Collection System; which discharges untreated effluent into the sea. Septic Tank, Soak Away Pit and Pit Latrine are the disposal methods most highly utilized in the rest of the country.

2.2.9 The Grand Anse sewerage system is expected to serve the entire Grand Anse population of 12,400 when fully commissioned. This project, funded by USAID, is divided into two phases: Phase One was completed in March 1993. It involved the laying of the force main from the Fall Edge to Point Salines and the outfall 1,150 feet off Point Salines, and the installation of force pumping stations. Phase Two, which involves the connection of buildings to the system is currently in progress with a scheduled completion of date July 1994.

MAJOR PROBLEMS

2.2.10. The different methods of waste disposal pose a variety of problems to Liquid Waste Management in Grenada. Firstly sewerage disposal systems at St. George's and at Grand Anse discharge untreated effluent into the sea. Secondly, in the unsewered areas, particularly the densely populated areas, pollution from badly constructed pit latrines, grey water, malfunctioning septic tanks and soak away pits have been the major cause of environmental problems. Pit latrines are inadequate for handling grey water. Traditionally, grey water has been used for irrigational purposes and it has not been known to create any significant environmental hazard, particularly in the rural areas.

LAND USE MANAGEMENT

2.3.1. At the core of the problems relating to land use management in Grenada is the rapid decrease in the amount of available agricultural lands and the degradation of the quality of these lands. A large proportion of Grenada's agricultural lands, for example, have been transformed into human settlement and commercial development. Moreover, a considerable amount of the remaining agricultural lands have lost their productive capability.

2.3.2 The problems encountered here result from poor land use and insecure tenureship. Government has outlined sound policies relating to the conservation of biodiversity and the wise use of the physical and marine environment.

In addition, there is a lack of coordination between the more than eleven Government Agencies responsible for land use management. This lack of inter agency collaboration, the absence of a land use policy and the fact that decisions relating to land use are often made on an ad hoc basis all contribute to the problems of controlling and mitigating the environmental and socio-economic impact on sustainable development and impinge on the management of natural resources.

2.3.3. Government recognizes the urgent need to address the problem of inappropriate land use, and in this regard work has already commenced on the formulating of a National Land Use Policy. In addition, structures are being put in place to facilitate the preparation of a Physical Development Plan, which is expected to address the physical, economic and social dimension of development planning.

Preparation of this plan however, is being affected by staff shortage at the Physical Planning Unit, the department charged with the responsibility for preparing the National Physical Development Plan.

2.3.4 PROPOSED ACTIONS

Government has taken steps to overcome this problem by:-

- encouraging an inter-sectorial approach to land use planning and zoning.
- formulation of a land use policy to protect land use resources and safeguard against degradation.
- dissemination of information to all groups, particularly communities on hill-side areas to discourage land use practices that result in environmental degradation.
- discouraging the practice of deforestation through public awareness programmes.
- introduction of legislation to manage and conserve the land resources.
- designation of protected areas for conservation of biodiversity.
- integration of the Physical Planning Unit within the Economic Planning Division of the Ministry of Finance.

2.4 COASTAL ZONE MANAGEMENT

2.4.0 The Fisheries Division is responsible for fisheries management in Grenada, its main focus being on what affects the marine resources and fishermen. These coastal zone habitat which includes sea-grass beds, living reefs, salt ponds, wetlands and beaches, falls under fisheries jurisdiction.

Fishing operations can be classified into the following categories:

- (1) Land base fishing; (i.e beach scenes, nets and hand lines).
- (2) Coastal and reef fishing (small boats for demersal and molluscs and crustaceans species).
- (3) Offshore fishing (larger boats for migrating pelagic species).

These categories with the exception of (3) are adversely affected by water pollution, destruction of mangrove swamps and sand mining.

2.4.1. The problem with Coastal Zone Management is diminishing resources. According to the Fisheries Department, most coastal benthic species are greatly depleted and reef fishing has declined drastically. This situation is a consequence of over-fishing, spear-fishing and the destruction of fish habitat. Various type of solid and liquid waste and silt have been discharged into the sea eventually destroying the reefs. Most of the Western coastal reefs are covered with solid waste, debris, and old vehicles. Reefs along the East coast are also seriously affected. Most are covered with algae and some are already destroyed.

2.4.2. Over the years Government has taken a number of actions aimed at solving the problem. Through the Fisheries Department, it has introduced reef monitoring at Grand Anse, Grand Mal and Moliniere in conjunction with the Caribbean Environmental Health Institute (CEHI); sea grass beds monitoring on parts of the Eastern coast (currently restricted to Telescope and Marquis island); Quarterly beach profiling at Levera, Bathway, Conference and Pearls; Intermittent water quality monitoring at Douce and Sallie rivers, Lakes Antoine and Levera.

2.4.3. The lack of financial and technical resources have affected the Division's capacity to extend the programmes to other parts of Grenada. Nevertheless, the Division has been able to identify the source and extent of some problems, potential consequences and solutions. It has also assisted persons particularly those involved in the fishing industry, to become more sensitized and to appreciate the need to introduce conservation practices.

PROPOSED ACTIONS

2.4.4. In order to ensure sustainable fishing and increase Grenada's income from that industry, the Government proposes:-

- (1) to set up a system of marine zones which will include the designation of three locations as Marine Parks and Protected Areas.
- (2) to extended monitoring of mangroves along the East and West Coasts, Carriacou and Petit Martinique; and
- (3) to establish facilities for the assessment of the size and composition of marine stock in order to ensure adequate management with the aim of achieving sustainable yields.
- (4) to inventories marine resources.

2.5 WATER POLLUTION (Land Based)

Two agencies have responsibility for the control of water pollution, namely, the Ministry of Health which is responsible for monitoring water quality in the State of Grenada; and the Fisheries Division, responsible for water quality relating to marine life. Studies are being undertaken mainly on the most critical coastal areas extending from the St. John's River to Grand Anse Beach which are believed to contain the highest density of polluted water in Grenada due largely to the high concentration of industrial, commercial and residential development located within these zones.

2.5.1 Grand Anse Bay is the heaviest polluted water mass within that stretch of coastal waters, due not only to the land based pollutants emanating from the Grand Anse area, but also due to the westerly flood current which moves polluted water from the St. John's River and the St. George's area.

Land based pollution include:-

- discharge from abattoirs;
- industrial waste;
- eroded silt;
- grey water;
- raw sewerage discharge from outfalls and yachts;
- hillside run-offs from housing developments; and
- residue from biocides and agricultural fertilizer

2.5.2 Coastal waters are more seriously affected by water pollution problems. Various types of land-based pollutants enter the rivers, storm water drains and watershed run-off during heavy rains and are eventually discharged into the coastal waters, thus adding to the existing coastal pollution such as:

- leachates from refuse dumps and raw sewage discharge.
- disposal of marine waste into the sea.
- siting of disposal dumps in mangrove swamp, and
- effluent discharge from malfunctioning septic tanks in hotels and private/industrial treatment plants
- and other forms of waste carried out to sea by flood waters.

2.5.3 The polluted water in the Bay moves parallel to the coast and not immediately out of the area as would be the case if there was a unidirectional current. (Chambers, 1986 b).

2.5.4 The Harbour/Lagoon area as well as the St. John's River to Fort George area contain the second heaviest polluted water mass. An estimated 378.5 cubic meters or 100,000 gallons per day of grey water and 58.3 cubic meters or 15,700 gallons per day from overflowing septic tanks flow into the Lagoon from uphill housing developments. Added to that pollution load are wastes from yachts, repair shops and persistent leachates from the old municipal refuse dump on the Eastern banks of the Lagoon (Archer 1984 c). The Lagoon is flushed mainly by tidal action and therefore retains wastes for long periods.

2.5.5 The pollution discharged on the coast North of Fort George Point are mainly from the St. John's River. The Land-use in the river basin are a combination of farming, light industry and dense housing development. Industrial wastes are discharged directly into the river or its tributaries.

2.5.6 The Town of Gouyave on the Western Coast presents similar problems. Like St. George's, the bulk of land-based pollution - sewage, silt, solid waste - is transported to the sea via Little River which passes through the town.

2.5.7 Precise information on the effects of water pollution in the entire state of Grenada is not readily available. Nevertheless, the destruction/depletion of some river and benthic species together with incidents of water-borne infections present obvious clues that the situation is potentially hazardous. There have also been regular incidents of Gastro-interitis and Viral Hepatitis.

PROPOSED ACTIONS

2.5.8. As a means of addressing the problem of water pollution, Government has undertaken a number of actions including:-

- the proposal for the relocation of solid waste disposal sites and a solid waste management plan for Grenada;
- the improvement of the St. George's sewerage system;
- the proper disposal of grey water and other forms of liquid and solid waste;

These programmes are being carried out by the Solid Waste Department of the Ministry of Health. Efforts are being made by the Ministry of Agriculture to sensitize farmers on the problems of erosion, proper farm practices and the safe use and disposal of biocides.

2.6 FORESTRY AND PROTECTED AREAS

2.6.0 Approximately 6,956 ha of Grenada's lands are classified as forest and woodlands. The state owns about 69% or (4,800 ha) and the remaining 3,967 are privately owned, most of which (3,448 ha) are in protected watershed and proposed national parks zones. (Forestry Department National Forestry Action Plan 1993).

2.6.1 The current legislation, Grenada Forestry Amendment Ordinance No. 34, of 1984, applies only to the Grand Etang Forest Reserve (1,662 ha) on the island of Grenada and 121 ha in Carriacou.

2.6.2 Forestry and watershed responsibilities are shared by three agencies; Forestry Division and National Parks, jointly responsible for the management of the forests and watersheds in Grenada, and NAWASA, with responsibility for areas that affect its water resources.

MAJOR PROBLEMS

2.6.3. The main environmental problems with Forestry and Protected areas in Grenada are top-soil erosion, deforestation, destruction of wild-life habitat and the reduction in water levels within watershed areas.

PROPOSED ACTIONS

2.6.4. In order to address those problems, Government has, through the Forestry Department of the Ministry of Agriculture, implemented reforestation and conservation projects aimed at reforesting degraded lands, controlling soil erosion and maintaining watersheds.

2.6.5 In recent years attention has turned to greater utilization of the forest plantations for timber and fuel-wood production, thereby reducing pressure on the natural forest. As a result, two nurseries are presently operated by the Forestry Department at Vendome for the production of Christmas tree seedlings and others. This project has been very successful. To date, 165 have been established at Les Avocats, Ponom, Grand Etang, Petit Etang, Vendome and St. Margaret. More than 90% of the area was planted in Blue Mahoe, and about 65% in Caribbean Pine.

2.6.6 The National Parks Unit is responsible for the management (preservation and use) of the country's natural and cultural heritage. The largest component of this heritage, the Grand Etang Forest and Watershed, is also managed by the Forestry Department, followed by seascapes, which is managed by Fisheries.

PROPOSED ACTIONS

2.6.7. Within the next five years Government proposes to implement four priority projects costing a total of EC\$10,389,673 (US\$3,848,027). Those projects are: Land Use and Integrated Watershed Management:- Carriacou Integrated Land Use and Forestry Development; Forestry Management and Institutional Strengthening; Development of National Parks System.

2.7 BIODIVERSITY

There are over 850 different species of plants and animal life coexisting in Grenada. Government is committed to the protection of plant and animal life in its effort to promote the conservation of biodiversity.

In this regard, special mention must be made of the Grenada Dove, which is the National Bird of Grenada. Government will take the appropriate measures to ensure that the Grenada Dove, and other endangered species of wild life are not faced with possible extinction in the foreseeable future.

2.8 NATURAL HAZARDS

2.8.1 Some of the natural hazards that can affect Grenada are hurricanes, storm surge, landslides and rock-falls, floods, earthquakes and volcanic eruptions. All of the above with the exception of earthquakes and volcanic eruptions have caused loss of life in Grenada within the last century.

2.8.2 Grenada has not experienced any major volcanic activities in recent history. Terrestrial volcanic activity is confined to small fumaroles and hot springs mainly in the highland areas. Small earthquakes have been occasionally on the island.

2.8.3 A submarine volcano, Kick 'em Jenny, is located about seven kilometers off the main islands. This volcano is one of the most active in the Lesser Antilles and indications are that its emergence above the sea may soon occur. Its activity is monitored by Seismologists on the island of Trinidad. Eruptions were recorded ten times in this century, the most recent in 1991. Occasional rumblings and tremors associated with volcanic activities have been experienced on the north coast. In 1988 eruption columns were ejected above the surface of the sea. Bathymetric surveys conducted between 1962 and 1983 indicated that the volcanic summit grew towards the surface by about 40 meters. In 1991 the summit laid at a depth of about 160m.

2.8.4 Grenada is located just south of the hurricane belt, hence it is not often seriously affected by hurricanes. Between 1901 and 1964, twenty-one tropical storms affected Grenada. However, the only major hurricane was Hurricane Janet of 1955, which destroyed properties, infrastructure and the agricultural base. It took the Government almost one decade to restore the agricultural base which was the backbone of the country's economy.

2.8.5. The National Disaster Preparedness Committee is charged with the responsibility of ensuring that Grenada is in a state of preparedness for potential disasters. It is comprised of 15 management sub-committees: Public Information and Education; Damage Assessment; Health Services; Emergency Telecommunications; Emergency Supplies; Public Utilities; Rehabilitation and Reconstruction; Search and Rescue; Welfare Services; Voluntary Services; Earthquakes and Landslides; Marine Pollution and Oil Spills; Hazardous Materials and Toxic Wastes. In order to provide the essential links between the National Disaster Committee and the community, sixteen (16) District Committees have been established corresponding with the electoral constituencies, except Petit Martinique which forms its own committee.

2.8.6. The National Disaster Preparedness Committee has prepared a national disaster plan which is reviewed/updated annually. Until the imminent threat of eruption of Kick 'em Jenny, attention has been primarily focused on hurricanes and storms. The plan involves the mobilization of human and material resources in the planning, training and managing the various aspects of a disaster or emergency. Public awareness has been a key element of the plan. Plans are also on the way for the refurbishment of a Central Emergency Operations Centre (EOC), and office to include a Communication Centre. Other actions include a proposed project on Mass Casualty Management.

2.8.7 The siting of residential buildings and other land developments within hazard prone areas - susceptible to floods, landslides and rock falls; the limited public response to are some of the problems which pose a serious threat to disaster mitigation and the failure to put in place an adequate response capacity mechanism.

PROPOSED ACTIONS

2.8.8. Government has embarked on programmes to address the above problems. They include:-

- intensifying the disaster preparedness public awareness campaign;
- establishment of early warning systems and facility to monitor Kick 'em Jenny volcano;

2.8.9. During the next three years Government proposes to put greater emphasis on disaster mitigation. It will also introduce guidelines to minimize risk in the event of a disaster and provide the community with information on natural and man or human induced disasters, particularly in light of the presence of industrial parks, and other technological innovations - accidents, spillage, explosions, fires.

3. LEGAL INSTRUMENTS AND INSTITUTIONS

3.1 LEGAL INSTRUMENTS

3.1.0 The legislative basis for the management of natural resources in Grenada can be traced back to the enactment of the 1946 Town and County Planning Ordinance, which introduced Urban and Land Use Planning in Grenada. In 1965, almost two decades later, a central Planning and Housing Authority was set up to review development proposals and to control development.

3.1.1 The dissolution of local government in 1969 left the development control functions exclusively in the hands of the central government. At about the same time a new law, the Land Development Control Act, created a new centralized authority - the Land Development Control Authority in 1968, - which is, responsible for both Planning and Development Control in Grenada.

3.1.2 Since the early 1940s, several other pieces of legislation and regulations have been enacted and amended with a view to providing the necessary legal framework for the many different agencies dealing with environmental resources to better manage those resources.

Strengths and Weaknesses

3.1.3 Grenada now has in place legislation to protect its water catchment areas, its beaches, biodiversity and wildlife, natural heritage and marine resources. Three pieces of legislation stand out in this regard:-

- (i) The Grenada Fisheries Act, 1986,
- (ii) National Parks and Protected Areas Act,
- (iii) The National Water and Sewerage Authority Act, and an amendment to The Forests, Soil and Water Conservation Act, 1949.

3.1.4 A new Town and Country Planning Act also exists in draft form and sets out extensive provisions for the establishment of a National Environmental Council representing a wide cross section of interests in Grenada.

3.1.5 Despite the body, some critical legislation are seriously outdated. Legislations dealing with environmental control is still dispersed among a wide range of agencies and generally lack enforcement power. Some examples are as follows:-

- (a) The National Trust Act, 1967 is lacking in power to discharge its functions effectively. It has no rule-making powers and cannot prevent the destruction of buildings of historical significance;
- (b) The general perception in the tourism industry is that the legislative base is inadequate in terms of both substantive law and enforcement procedures. For example the Tourist Industry (Vendors License) Regulations established vending zones and required vendors to have a license to sell in those zones. However, the regulations stop short of prohibiting in areas outside of those specified zones and provides a vehicle for tourist harassment;
- (c) Although the Forestry Act as amended is a considerable improvement on the principal enactment, it still does not provide an adequate basis for sound environmental management. Substantive provisions of applicable legislation do not go far enough in controlling or regulating activities like saw milling and the use of chain saws which could impact adversely on forestry management;
- (d) Pollution control under the Public Health Ordinance follows the legal theory of nuisance defined to include any accumulation or deposit which is injurious to health. The difficulty of proof under nuisance theory, added to the very outdated provisions and extremely low penalties of the law, weakens its enforcement;

- (e) A major deficiency of applicable legislation regarding the Abatement of Litter Act, is its restrictive focus, namely, the collection and disposal of waste. It does not address waste management as a process involving a wide range of related activities such as waste reduction, collection, transportation, separation, re-cycling, re-use and disposal. Also, no regulations have been established to implement such principal legislation in order to provide guidance for environmental managers;
- (f) Although there are several enactments on the statute books affecting agriculture in Grenada, there appears to be no Agricultural Act;
- (g) No regulations are known to exist in areas of "preservation of the marine environment of Grenada and the prevention and control of pollution thereto", under the Grenada Territorial Waters Act;
- (h) Apart from the Beach Protection Act, 1979, which regulates and controls Sand Mining, there appears to be no legislation governing Mining in Grenada.

Recommendations

3.1.6 The following are some recommended changes for the improvement of the legal instruments:

National Trust: Powers should be given to the national Trust to enable it to carry out its functions effectively.

Tourism: The regulations will be reviewed to address problems in areas outside specific vending zones.

What is proposed is comprehensive zoning legislation prohibiting or regulating as appropriate, various activities near or on the seashore, especially in areas where the mooring of yachts, scuba diving, and related recreational activities are destroying the coral reefs, and uncontrolled disposal of garbage from pleasure craft result in the destruction of marine resources.

Forestry: Legislative framework for the preparation of a National Forestry Development and Management Plan to be completed within a statutorily defined time-frame, to provide tax and other incentives for forestry development.

- Waste Management: Update legislation to include the application of modern technology and management systems and to provide guidance for environmental managers.
- Pollution Control: Legislation to be updated.
- Agriculture: Legislation will be made to underscore the social responsibility of owners of agricultural lands to develop such lands with due regard for the environment by including general acceptable standards of good husbandry.
- Land Development Control: Environmental impact assessment for environmentally sensitive areas will be made mandatory.
- Marine Pollution: Legislation be enacted to protect the coastal zones from land-based and other sources of pollution.
- Mining: Legislation be enacted to protect the marine environment in anticipation of the extracting of minerals etc.
- Legislation to prohibit the practice of indiscriminate sand mining.

3.2 INSTITUTIONS

3.2.0 Responsibility for environmental management is dispersed among no less than fifteen (15) Government agencies (Government departments and Statutory boards). There is no mandatory provisions for coordination between these agencies. The Land development Control Authority (LCDA) and Physical Planning Unit (PPU) are expected to perform this role. However, as discussed earlier, they are hampered by many problems including the lack of an approved Physical development Plan. This situation often results in duplication and conflicting activities which sometimes contribute more to the degradation of the environment. It also encourages wastage of resources.

3.2.1 The major weakness of these government agencies responsible for environmental management lies in their lack of interagency coordination and a legislative base for the enforcement of regulations. In addition, the ministerial functions for environmental management have officially been placed in the portfolio of the Ministry of Health, formerly it was in the Ministry of Education. Prior to that it was in the Ministry of Communications and Works.

3.2.3 Pollution control under Public Health Ordinance follows the legal theory of "nuisance" which the enabling legislation defines as the accumulation or deposit which is injurious to health. The difficulties of proof under the nuisance theory, plus the very outdated provisions and the extremely low penalties of the Law, weakens its enforcement.

3.2.4 Government recognizes the need for an integrated approach to environmental planning and management. Moreover it is well understood that effective management, policy and planning require capacity building, in particular sound institutional development.

Proposed Actions

3.2.5 In order to strengthen the institutional framework for environmental coordination the following changes are proposed:-

- (a) The Ministry of Planning and Development to be designated as the body responsible for integrated management and planning on all environmental matters.
- (b) The establishment of a commission on sustainable development within a legal and administrative framework. The Commission will have its Secretariat and more importantly, an Environmental Desk. It will act in an advisory capacity on all matters relating to the environment.
- (c) Strengthening of the existing institutions, such as a Land Development Control Authority (LDCA) and the Physical Planning Unit (PPU).
- (d) Enhancement of the formal mechanisms within Government for inter-sectoral co-operation and co-ordination and the role of social partners in environmental management and planning.

3.3 PUBLIC AWARENESS

3.3.0 The Government of Grenada has given careful consideration to providing for the participation of the social partners in the management of the environment. The various interest groups, particularly the non-governmental agencies have been at the forefront of public awareness campaigns aimed at developing a consciousness among the grenadian public reaching the various communities and stimulating their awareness of how to protect and safe-guard the environment.

3.3.1 Information on environmental issues are dispersed among Government Departments with the Documentation Center housing the largest collection. Although the public has access to these facilities, information is generally disseminated through radio, television and public forums. Working with community leaders and individuals on various issues in order to promote environmental awareness will be focus in the short term.

PROPOSED ACTIONS

- promote community participation in matters relating to environmental issues;
- encourage public consultations on the integrated approach to environment and sustainable development.

4. STRATEGY FOR ENVIRONMENTAL ACTION

4.0.0 The following is a summary of the programme of action for environmental management.

MATRIX OF PROGRAMS AND ACTIONS (CONT'D)

ENVIRONMENTAL ISSUES	ACTION	94	95	96
COASTAL ZONE MANAGEMENT	<p>Set up a system of Marine Resources.</p> <p>Extend monitoring of coastal pollution.</p> <p>Assess the size and composition of marine stock.</p> <p>Intensify the monitoring of water quality using CEHI resources.</p> <p>Establish guidelines and regulations for pesticide use.</p>			
WATER POLLUTION	<p>Introduce proper waste disposal systems throughout.</p> <p>Continue reforestation and conservation projects.</p> <p>Implement a land use and integrated watershed management project.</p>			
FORESTRY AND PROTECTED AREAS	<p>Implement a land use and Forestry development project for Carriacou.</p> <p>Implement a Forestry Management and Institutional Strengthening project.</p> <p>Develop the National Parks system.</p> <p>Reunite National Parks with Forestry.</p>			
NATURAL HAZARDS	<p>Focus on disaster mitigation.</p> <p>Introduce guidelines to minimize risk.</p> <p>Provide the public with information on natural hazards.</p> <p>Establish early warning systems for Kick 'em Jenny</p>			

LEGAL INSTRUMENTS	Introduction of Legislation to provide a sound basis for environmental management and pollution control.			
INSTITUTIONS	<p>Development of inter-departmental co-ordinating mechanism on environment.</p> <p>Establishment of a Commission on sustainable development using an integrated approach.</p> <p>Integration of Planning and adoption of a methodology that is more geared to small island states.</p>			
PUBLIC AWARENESS	Strengthen existing public awareness programmes.			

APPENDIX

PROJECT PROFILE

Project Name: LAND USE AND INTEGRATED WATERSHED MANAGEMENT

Problem:

- Poor land use practices
- Squatting and shifting cultivation
- Water shortage
- Limited training in institutional infrastructure for soil and water conservation

Objective:

- To establish structures for watershed management planning

Description:

- Development of a land tenure map for Grenada and Carriacou
- Development of a plan for the protection of water catchments in Grenada and Carriacou
- Development of a land zoning scheme
- Assessment of the fragility of the soils according to soil properties and develop appropriate treatment oriented land capability schemes

Duration:

- Five years

Cost:

- US\$1,487,970 EC\$4,017,520

National Agency: - Forestry Division

Project Name: CARRIACOU LAND USE AND FOREST MANAGEMENT

Problem:

- Environmental degradation (soil erosion, lack of protective cover in upper watersheds)
- Livestock food shortage

- Objective:**
- To develop and implement a system of control and management of livestock which will promote sound land use practices and thus reduce the level of soil degradation caused by livestock raising
 - To improve livestock production through improved grass and leguminous pasture species, fodder trees and enclosures

- Description:**
- Identify fencing needs of farmers
 - Establish subsidized fencing scheme for farmers
 - Develop and fence 20 hectares of common grazing ground
 - Training of livestock officers

Duration: - Three years

Cost: - US\$719,592 EC\$1,942,898

National Agency: Ministry of Agriculture, Livestock Division

Project Name: FOREST MANAGEMENT AND INSTITUTIONAL STRENGTHENING OF FORESTRY

Problem: - Inefficient Forest Management

- Objective:**
- To strengthen the Forestry institution
 - To improve forestry development and management
 - To promote tree-farming practices on private lands
 - To increase public awareness of conservation through education and community involvement

- Description:**
- Construction of a forest headquarters with adequate facilities and equipment
 - To update existing forest legislation, identify conflicting Causes and recommend solutions

Project name: PERSEVERANCE SANITARY LANDFILL PROJECT

Problem: Hazardous collection and disposal sites

Objective:

- Find ways of accommodating projected waste for over 10 years
- Discontinue the use of wetland for waste disposal
- Upgrading of collection sites

Description:

- Development of human resources
- Improvement of maintenance and supply of equipment
- Relocation of disposal sites

Duration: Three years

Cost: \$1,095,000

National Agency: Solid Waste Division of the Ministry of Health

Table 3.2.1 National Resource Management Legislation in Grenada.

PLANNING	<ul style="list-style-type: none"> - Town and County Planning Ordinance (Cap. 293, 1946) - Town and County Planning (Amendment) Ordinance (No. 36, 1966) - Town and County Planning Regulations (SRO No. 44, 1965)
DEVELOPMENT	<ul style="list-style-type: none"> - Land Development (Control) Act (No. 40, 1968) - Land Development (Control) Amendment (Ordinance (No.7, 1983) - Land Development (Control) Act Regulations (SRO No. 13, 1988) - Industrial Development Corporation Act (No. 2, 1985) - Grenada Agricultural and Industrial Development Corporation Act (No. 11, 1976); name changes to Grenada Development Bank by No. 33, 1980

- Grenada Agricultural and Industrial Development Corporation (Amendment) Act (No. 2, 1977)
- Grenada Agricultural and Industrial Development Corporation Regulations (SRO No. 3, 1978)
- Carriacou Land Settlement And Development Corporation Act 1976
- CROWN LANDS
 - Crown Lands Ordinance (Cap. 78, 1896)
 - Crown Lands Rules (SRO No. 36, 1934)
 - Crown Lands Amendment Rules (SRO Nos. 3, 19, and 39, 1965)
- AGRICULTURE
 - Pesticides Control Act (No. 28, 1973)
 - Pesticides Control (Amendment) Law (No. 88, 1979)
 - Pesticides Control (Labelling of Pesticides) Regulations (SRO(No. 9, 1979)
- FORESTS
 - Forest, soil and Water Conservation Ordinance (Cap. 129, 1949)
 - Forest, soil and Water Conservation (Amendment) Ordinance (No. 34, 1984)

Table 3.2.1 National Resource Management Legislation in Grenada. (Cont'd)

- FORESTS
 - Crown Lands Forest Produce Rules (SRO No. 85, (Cont'd) 1956) (5/340)
 - Protected Forests Order (SRO No. 86) (5/357)
 - Protected Forest Rules (SRO No.87) (5/358)
 - Protected Forests (Tuilleries-Bagatelle) Rules (SRO No.88, (3/360)
 - Grand Etang Forest Reserve Ordinance (Cap. 135, 1906)
- WATER
 - Water Supply Act (No. 23, 1969)
 - Water Supply (Amendment) Law (No. 30, 1979)
 - National Water and Sewerage Authority Act (1990)
- TOURISM
 - Tourist Trade Development Board Ordinance (Cap. 292, 1974)
 - Tourist Industry (Protection) Act (No. 47, 1972)

- Tourist Industry (Protection) Regulations (SRO No.20,1975)
- Tourist Industry (Vendor's License) Regulations (SRO No.2, 1986)
- Tourist Board Act (No. 29, 1988)

- NATIONAL PARKS - National Parks and Protected Areas Act, (1990)

- BEACHES - Beach Protection Law (No. 67, 1979)

- PROTECTED AREAS - Grenada National Trust Act (No. 20, 1967)
- Grenada Botanical and Zoological Gardens Act (No. 25, 1968)
- Grenada Botanical and Zoological Gardens Rules (SRO No. 55, 1968)

- WILDLIFE - Wild Animals and Birds (Sanctuary) Ordinance (Cap. 314, 1928)
- Birds and Other Wildlife (Protection (Amendment) Ordinance (No. 26, 1964)

Table 3.2.1 National Resource Management Legislation in Grenada. (Cont'd)

- MARINE RESOURCES - Grenada Fisheries Act (No. 15, 1986)
- Grenada Fisheries Act Regulations (SRO No. 9, 1987)
- Grenada Territorial Waters Act

- WASTE MANAGEMENT/
POLLUTION CONTROL - Public Health Ordinance (Cap. 237, 1925)
- Consolidated with revision through No. 20, 1956
- Public Health (Amendment) Law (No. 40,1981)
- Public Health (Amendment) Law (No. 9,1973)
- Public Health (Amendment) Law (No. 17,1973)
- Public Health (Amendment) Law (No. 29,1973)
- Public Health Regulations (SRO No. 1957) (6/953)
- Abatement of Litter Act (No.35, 1973)

- Plant Protection Act, 1986
- St. George's Harbor Regulations
- Foreign Animals (Protection of Importation) Order

(Source: Grenada Environmental Profile, 1991)

Table 3.3.1 Government Agencies with Resource Management Functions

KEY INSTITUTIONS WITH ENVIRONMENTAL RESPONSIBILITIES

INSTITUTIONS	DIVISION/UNIT	RESPONSIBILITIES
Ministry of Health and Housing	Environmental Health	Maintenance of Environmental health
Ministry of Education	National trust	Protection and Preservation of Grenada's National Heritage
Ministry of Works and Communications	Central Water Commission	Administration of potable water supply; construction and maintenance of water works
Ministry of Agriculture, Lands, Forestry, Fisheries	Agriculture	Extension Services; propagation and pest management; research on food crops; veterinary and livestock service, agronomy and conservation.
	Pesticide control Board	Enforcement of pesticide regulations
	Forestry	Protection and management of the nation's forests; soil and water conservation
	Fisheries	Promotion and management of fisheries; protection and preservation of marine reserves

Lands Division
and Land use

Administrative and
technical support
for Government's
land Division
policy; Responsible
for management and
use of State-owned
lands

**Table 3.3.1 Government Agencies with Resource Management
Functions (Cont'd)**

KEY INSTITUTIONS WITH ENVIRONMENTAL RESPONSIBILITIES

INSTITUTIONS	DIVISION/UNIT	RESPONSIBILITIES
Ministry of Tourism	Tourist Board	Tourism promotion and marketing
	Parks	Protection of natural and cultural resources
Ministry of Finance	Budget & Planning	F o c u s o n Government's Budget and Planning process
	Physical Planning	Responsibility for the planning, development and use of lands
	Land Development	Decision-making authority for p l a n n i n g applications
	Industrial Development Corporation	Promotion of I n d u s t r i a l Development in Grenada

(Source:

Grenada Environmental Profile, 1991)

CAPACITY BUILDING

COMMISSION ON SUSTAINABLE DEVELOPMENT USING AN INTEGRATED APPROACH TO ENVIRONMENTAL MANAGEMENT AND PLANNING.

OBJECTIVE

To coordinate the governments long term approach or strategy on environmental management and planning.

This Commission will have a legal and administrative framework. It will also have an Environmental Desk and should replace the non functioning National Environmental Conservation and Development Council.

The Commission will have its Secretariat within the Division of Planning and Development and will act in an advisory capacity to the Government.

TERMS OF REFERENCE

- Undertake the rationalization and consolidation of overlapping zones of managing environmental issues;
- Initiate environmental management plans and strategies
- Establish inter-ministerial linkages as well as linkages between public and private sector and non-governmental agencies
- coordinate the responses of Ministries and other government agencies
- responsibility for the implementation of the Plan of Action on the Sustainable Development of Small Island States adopted at the 1994 United Nations Global Conference on Sustainable Development in Barbados.
- Monitor environmental impact assessments (EIA) on all major projects;
- Assess the status of natural resources;

- Assist in the formulation of a strategy on land use and zoning and in the preparation of appropriate legislation and projects
- Responsibility for inter-regional linkages.

DURATION OF PROJECTS Two years

Funding for the above project is assured through CARICAD, and OECS through its National Resource Management Unit, once approval has been given by the Government of Grenada.

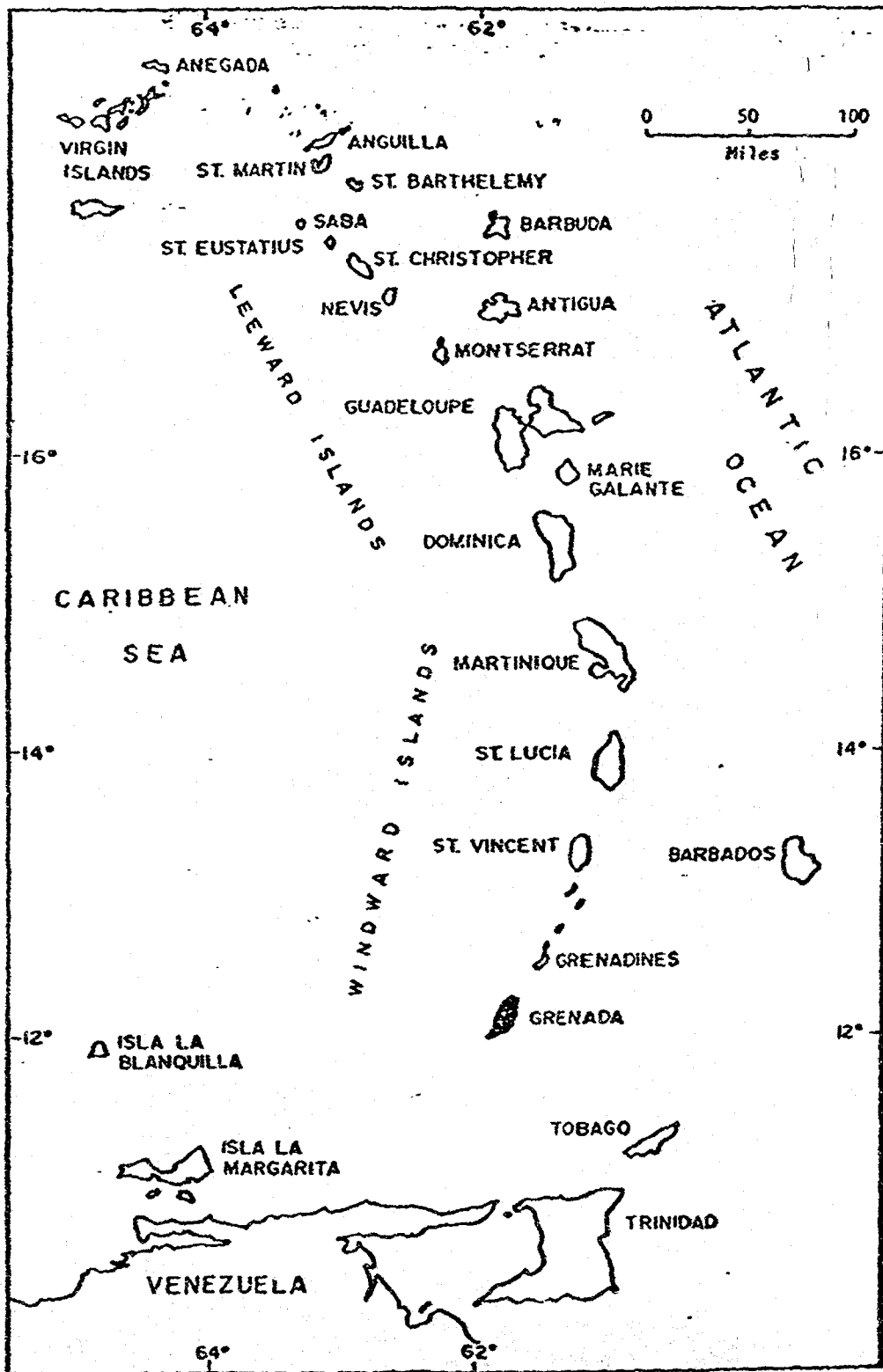


Fig. 1: Map of the Eastern Caribbean showing location of Grenada

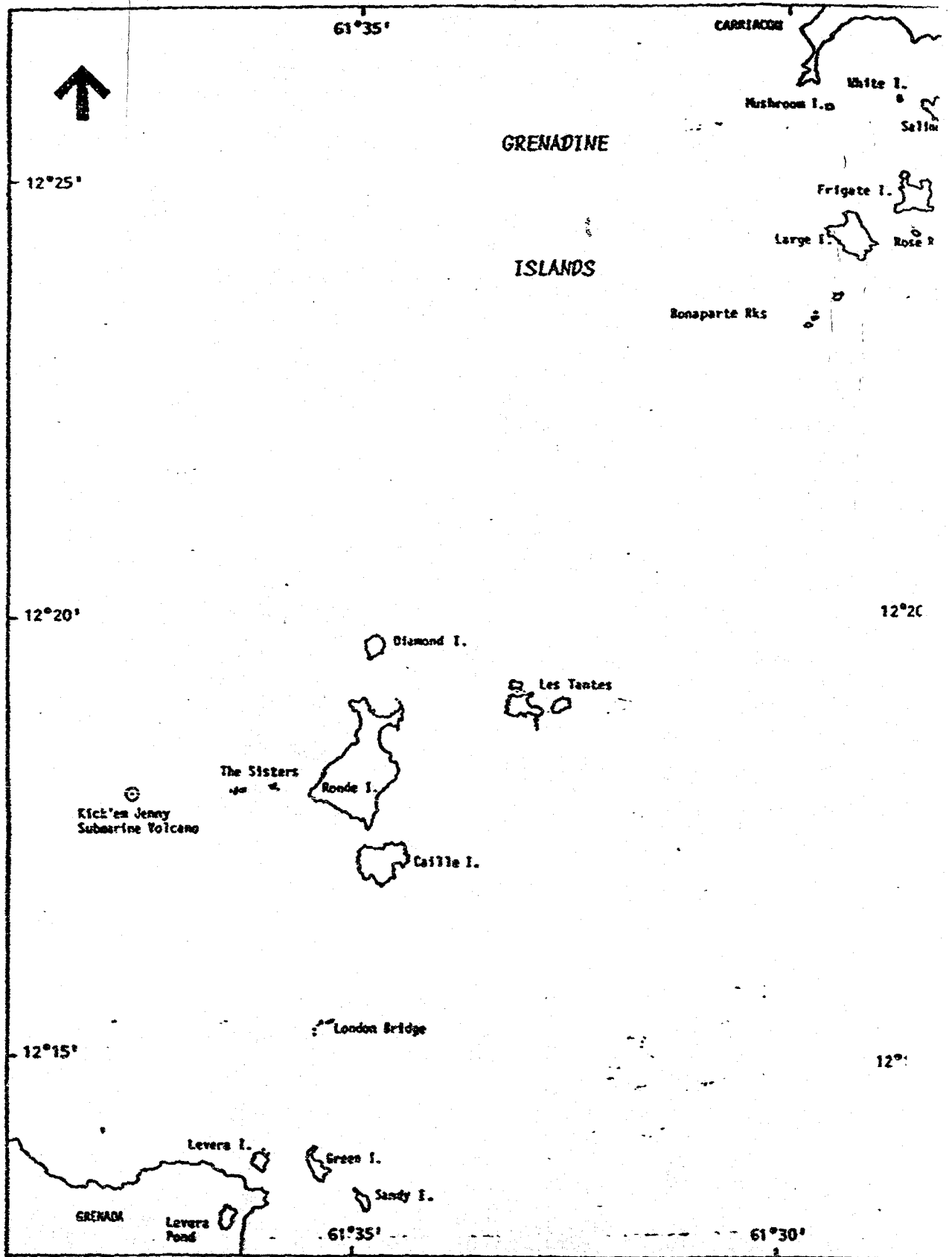


Fig.2: Location map of Grenada and the Grenadines

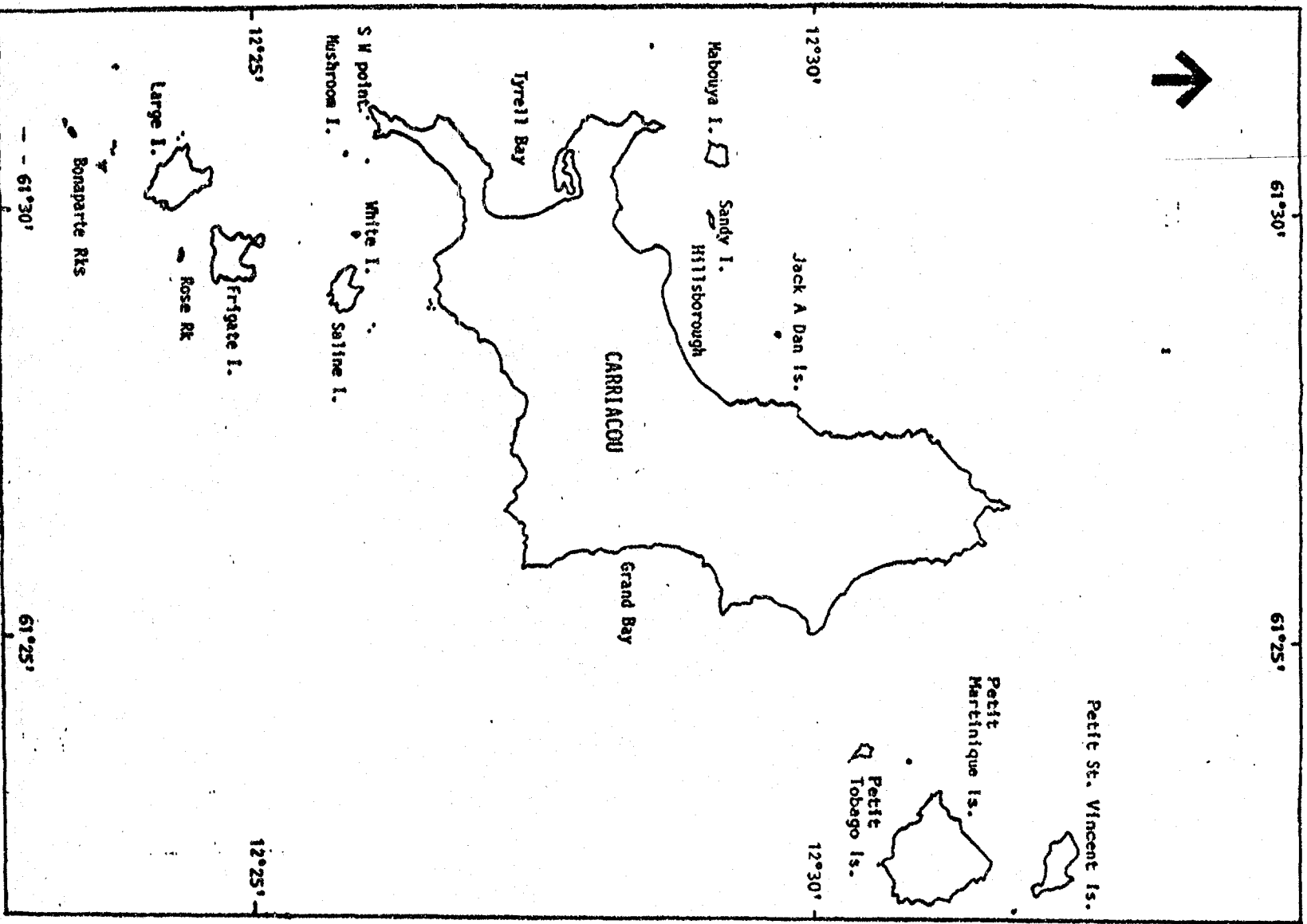


Fig. 3: Location map of Carriacou and Petit Martinique

GRENADA

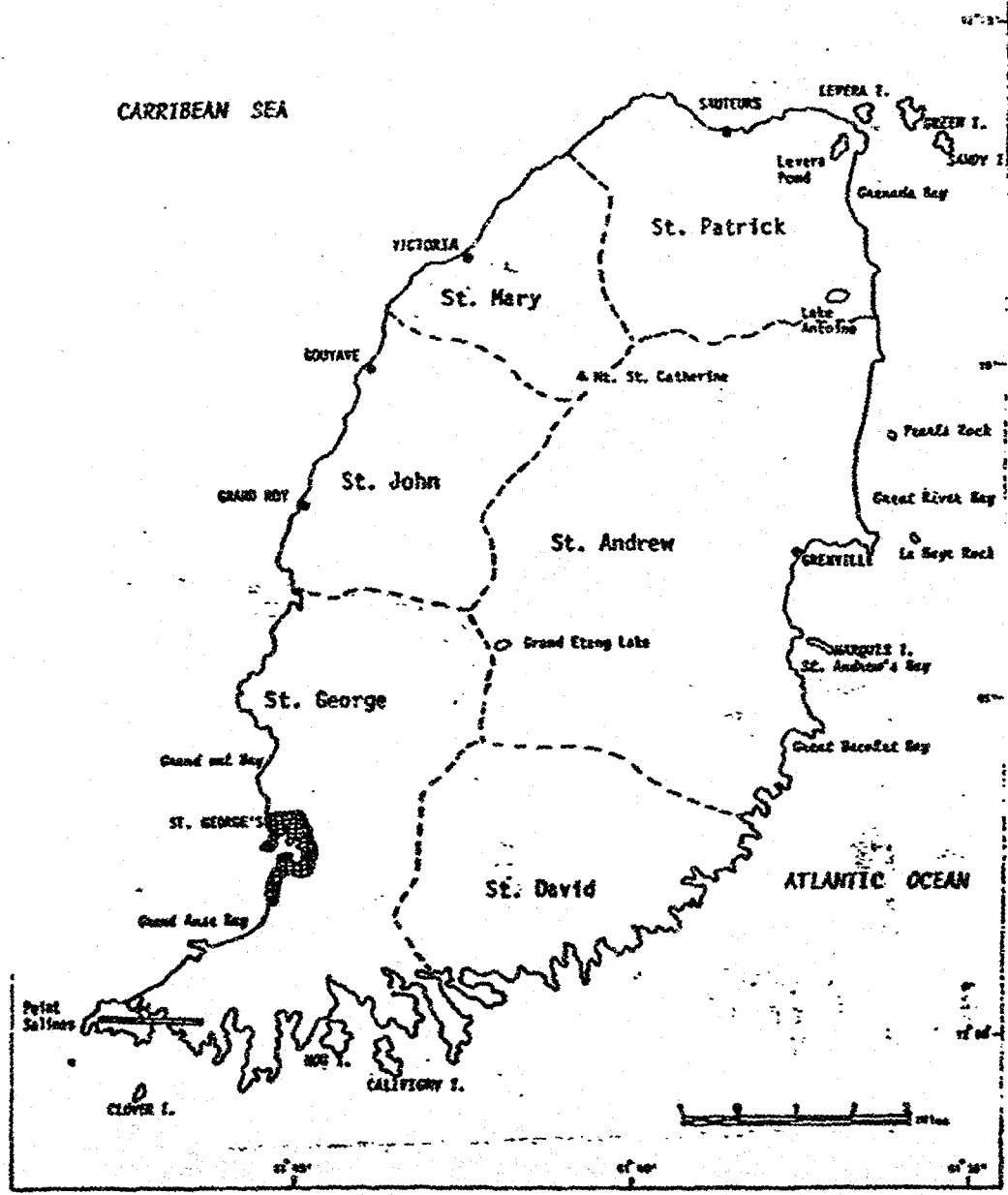


Fig.4: Location map of the island of Grenada

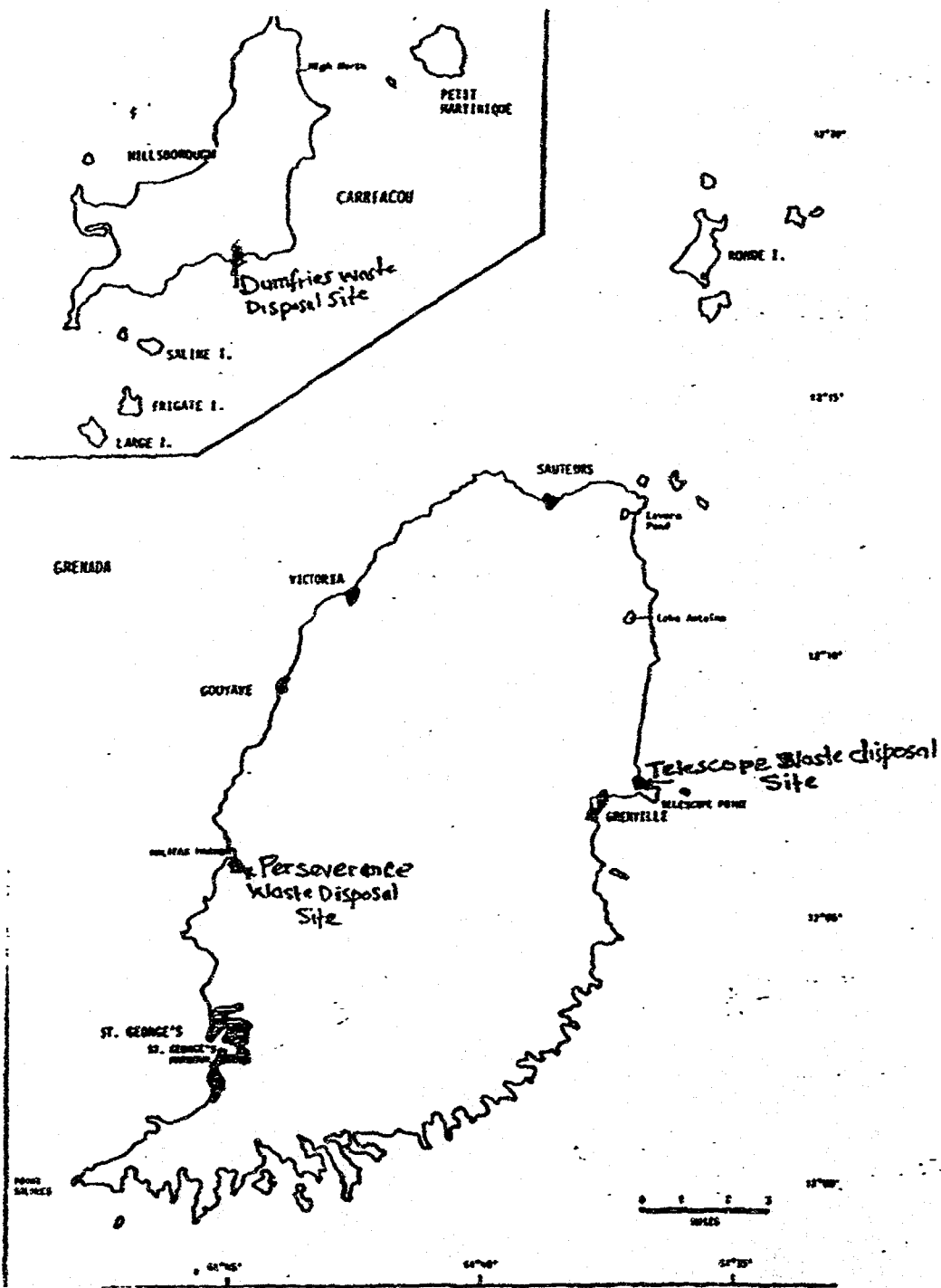


Fig. 2.1.1 Solid Waste disposal sites.

GRENADA - Existing Surface Water Supply Facilities

- 1 PETIT ETANG
- 2 NAMA CANNES
- 3 POMME ROSE
- 4 ANWICH
- 5 PLAISANCE
- 6 BELLEVUE
- 7 BRANDON HALL
- 8 MIRABEAU
- 10 MT. HORNE
- 11 PECCY'S WHIM
- 12 UNION
- 13 TUFTON HALL
- 14 DUGLADSTON
- 15 GLOZIER
- 16 GRAND ROY
- 17 CONCORD
- 18 ARMSDALE
- 19 VEHONE
- 20 BON ACCORD
- 21 MARDICRAS
- 22 RADIX SPRING
- 23 LES AVOCATS

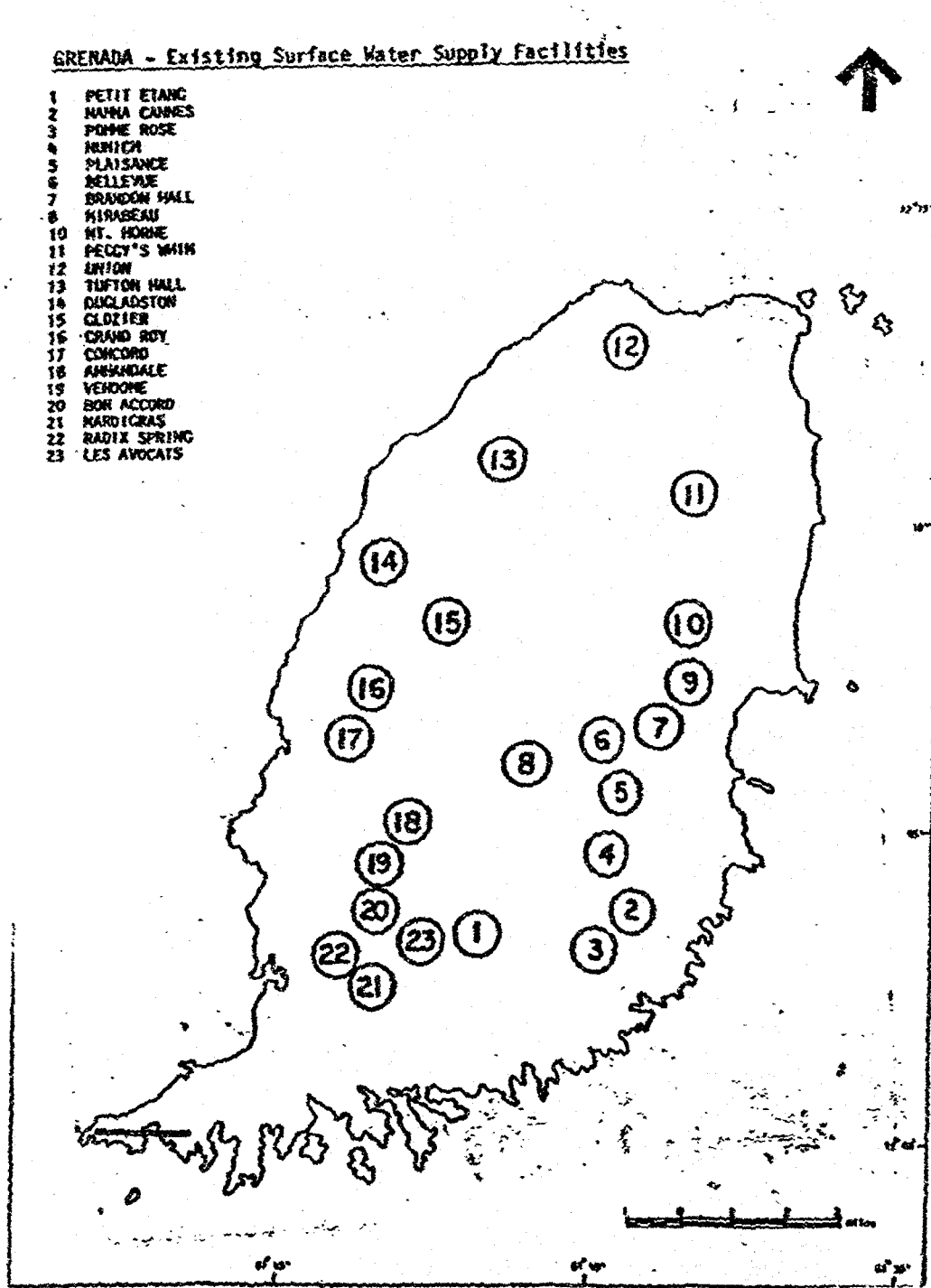


Fig. 2.2.1

Water Supply facilities.

(Source: Grenada Environmental Profile, 1991)

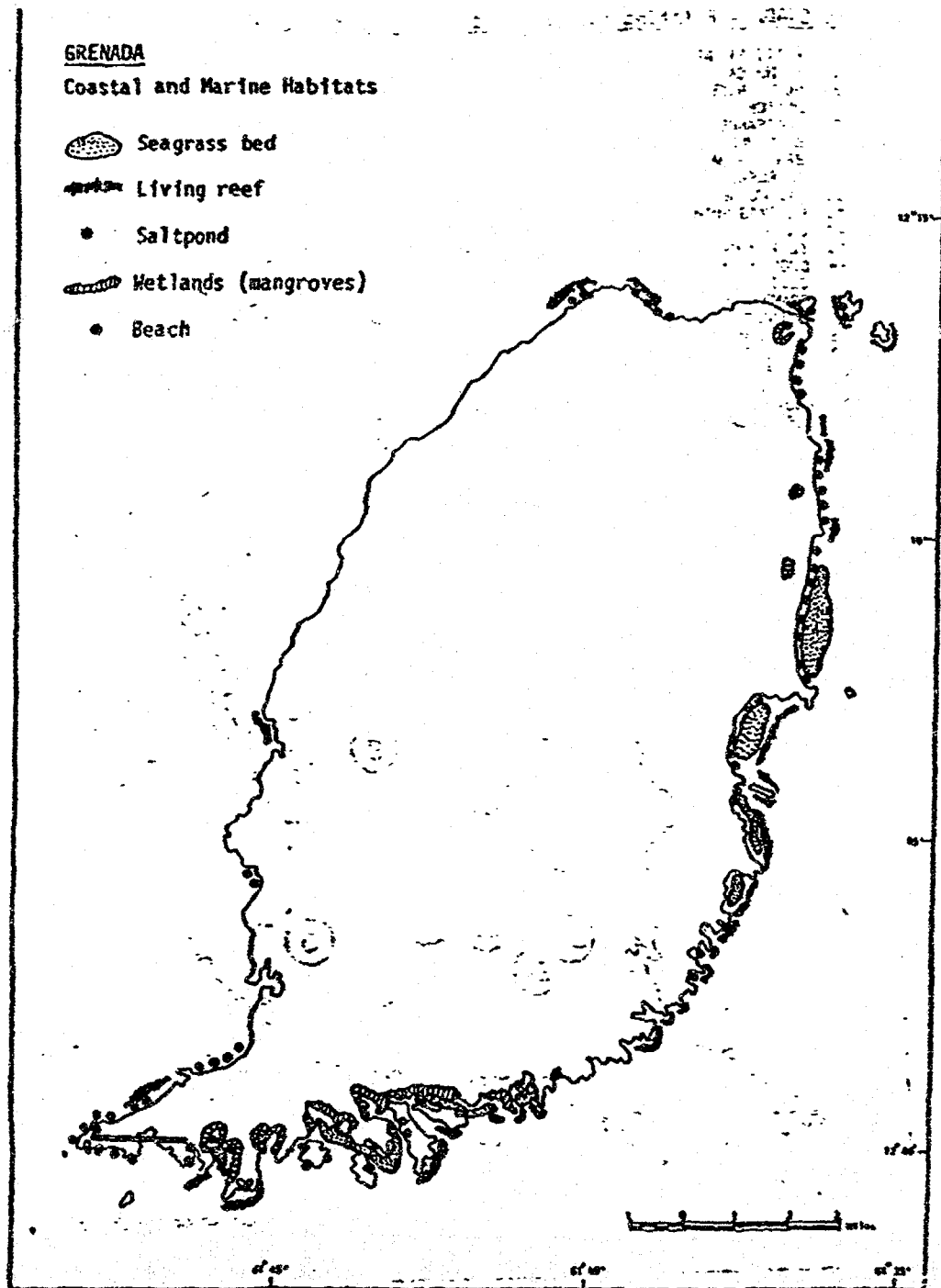


Fig. 2.4.1 **Distribution of Major Coastal and Marine habitats, Grenada**
 (Source: Grenada Environmental Profile, 1991)

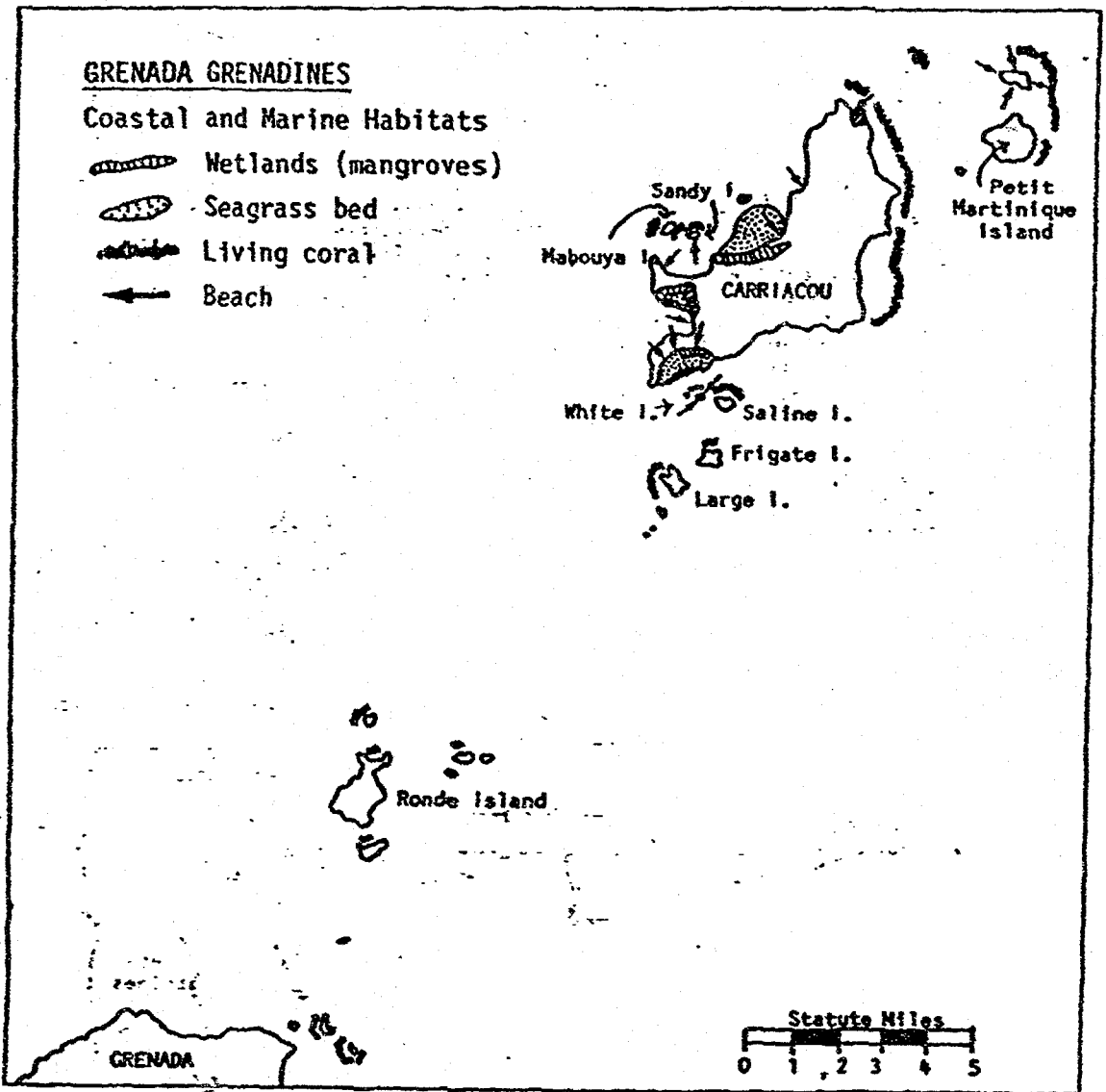


Fig. 2.4.2

**Distribution of Major Coastal and Marine habitats,
Grenada Grenadines**
(Source: Grenada Environmental Profile, 1991)

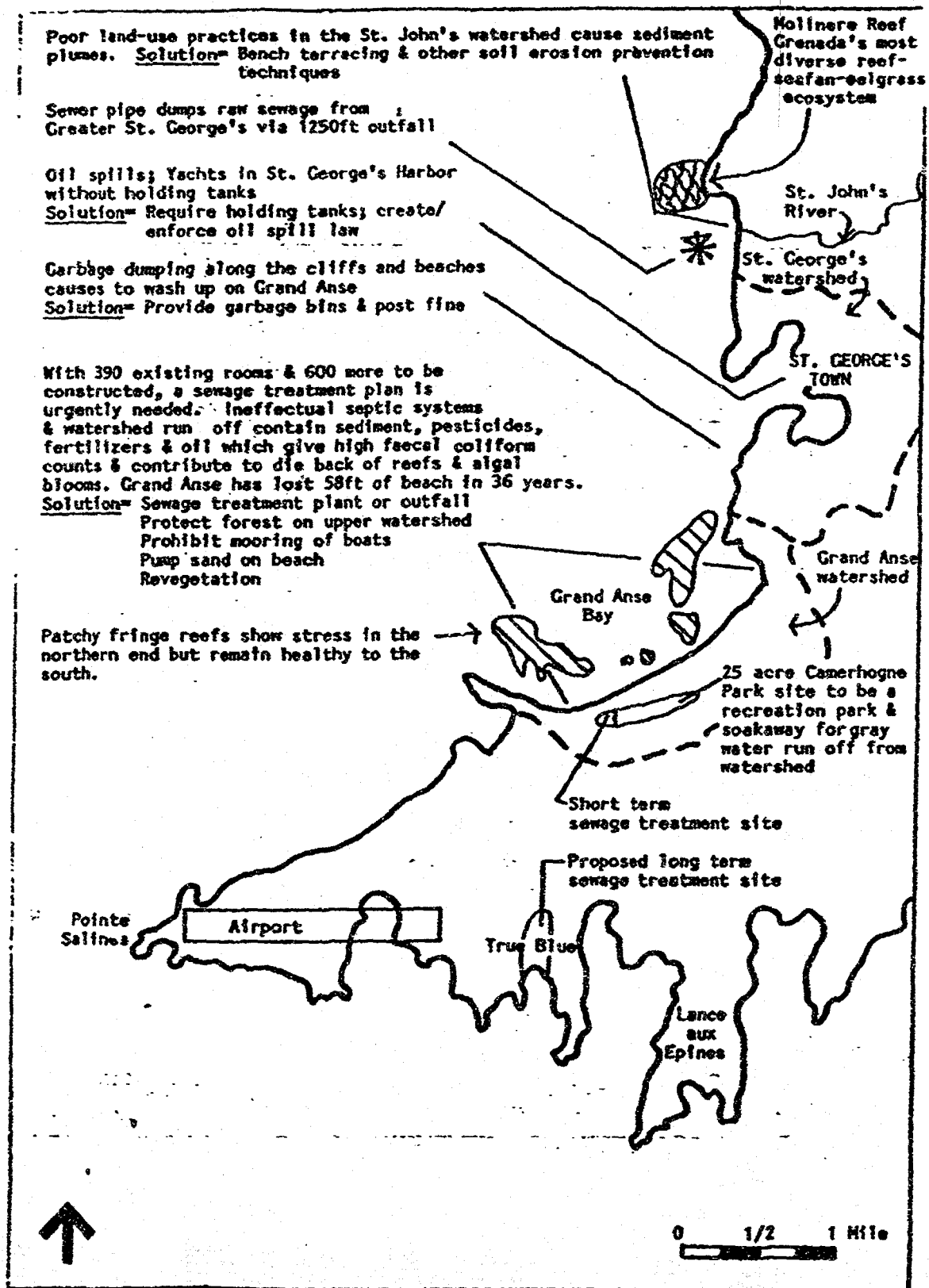
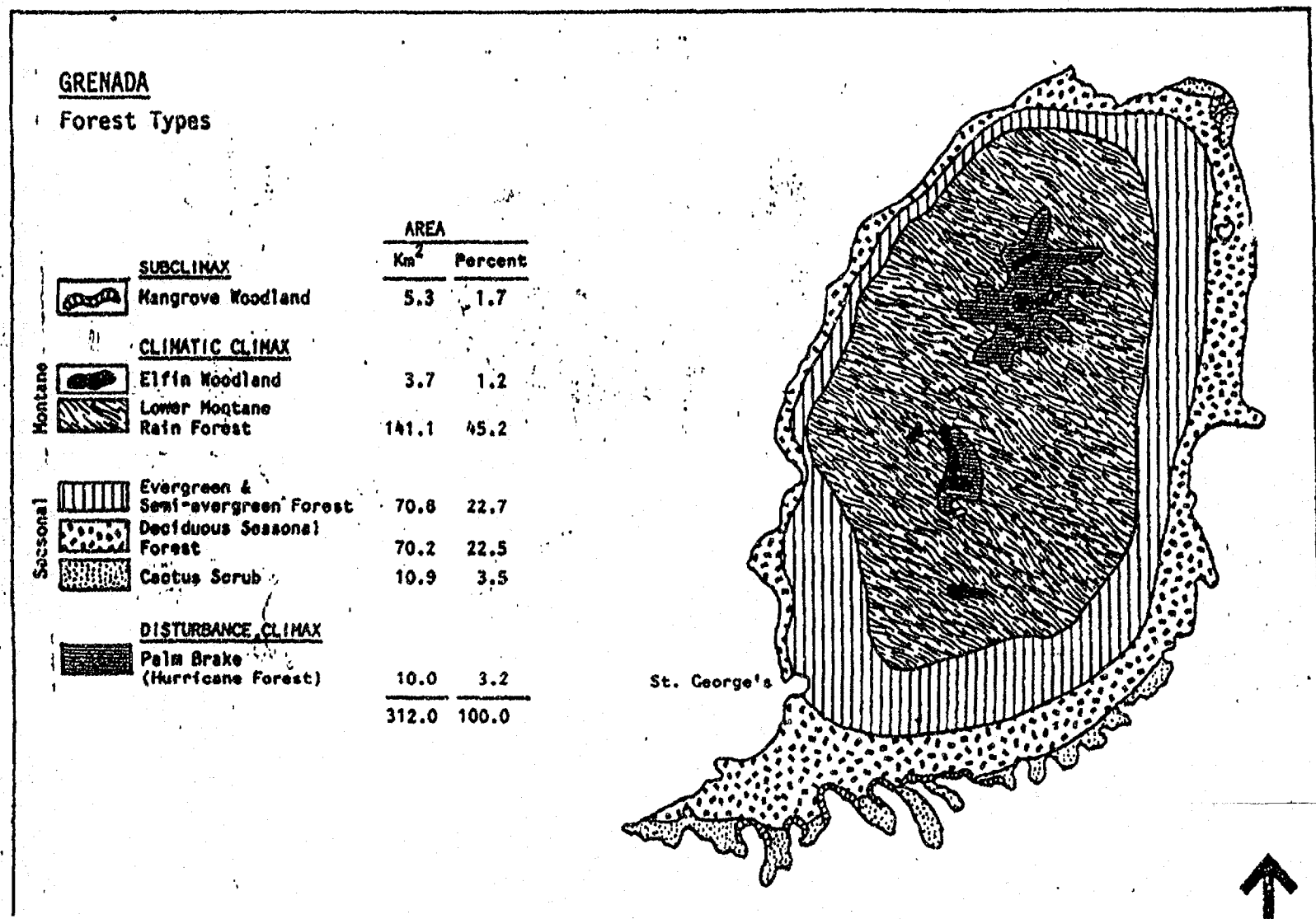


Fig. 2.5.1 Some Pollution Problems in South-Western Grenada. (Source: Grenada Environmental Profile, 1991)

Fig. 2.6.1

Distribution of "Climax" forest types in Grenada
 (Source: Environmental Action Plan, 1991)



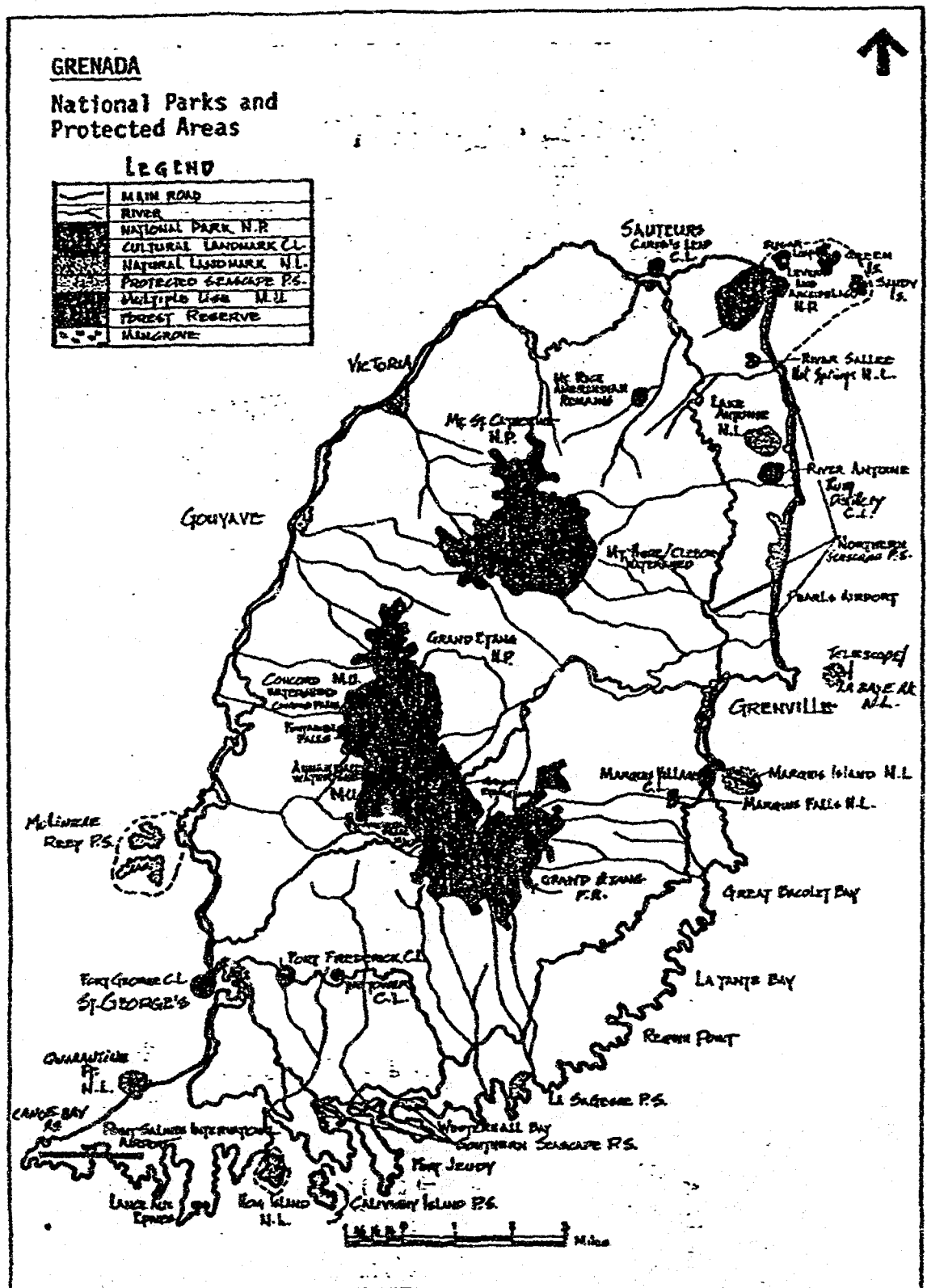


Fig. 2.6.2

Proposed System of National Parks and Protected Areas, Grenada
(Source: Grenada Environmental Plan, 1991)

